

REMARKS

Claims 1-3, 5-9, 11, 12 and 25-32 are pending in this application. By this Amendment, claims 4, 10 and withdrawn claims 13-24 are canceled without prejudice or disclaimer. Claims 1-3, 5-9, 11 and 12 are amended. Claims 25-32 are added.

It is noted that the claim amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability. Further, Applicants specifically state that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

With respect to the prior art rejections, claims 1, 4, 7, and 10 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Kronlund (U.S. Patent No. 5,877,077). Claims 2-3, 5-6, 8-9, and 11-12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kronlund and Kinoshita, et al. (U.S. Patent No. 6,511,908).

The rejections are respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

The invention, as described in independent claim 1 for example, is directed to an electrode for a p-type SiC that includes a first electrode material, and a second electrode material of aluminum (Al). The first and second electrode materials exhibit a eutectic reaction at a temperature of 600°C or lower and a layer made of the first electrode material is in contact with a surface of the p-type SiC (Application at page 3, lines 1-4; page 5, lines 17-21).

This structure is important because the formation of the first electrode material having such eutectic characteristics accelerates the eutectic reaction at lower temperatures and provides a better ohmic junction (Application at page 3, lines 5-12; page 4, lines 20-23).

Conventional SiC electrodes, as described in the Background of the present Application, use a combination of titanium (Ti) and aluminum (Al) in an effort to produce an ohmic electrode. However, such conventional SiC electrodes contain a large amount of Al to reduce resistance and need to be heat treated at temperatures of about 1000°C. As a result of these high temperatures devices using such electrodes have reduced functionality and a decreased useful lifecycle caused by deterioration of surface morphology and thermal

damage during heat treatment (Application at page 1, line 23-page 2, line 15).

In contrast, in an exemplary embodiment, this invention may provide an electrode for a p-type SiC having a good surface homology and little thermal damage to the semiconductor crystal layers caused by the formation of the electrode (Application at page 2, lines 18-22).

II. THE PRIOR ART REJECTIONS

A. The U.S.C. § 102(b) Kronlund reference rejection

In rejecting claims 1, 4, 7 and 10 as being anticipated by Kronlund, the Examiner alleges that Kronlund teaches each and every feature recited in the rejected claims. As claims 4 and 10 are canceled, the rejection of those claims is moot. There are elements of rejected claims 1, and 7 that are neither disclosed nor suggested by Kronlund.

For example, Kronlund fails to disclose or suggest, first and second electrode materials that exhibit a eutectic reaction at a temperature of 600°C or lower and a layer made of the first electrode material is in contact with a surface of the p-type SiC.

Kronlund discloses a method of producing an ohmic contact to a p-type SiC (col. 2, lines 7-10 of Kronlund). The method includes depositing individual layers of Al, Ti and silicon (Si) on the p-type SiC layer. Kronlund specifically indicates that the layers should be deposited on the p-type SiC layer in the order of Al/Ti/Si (col. 2, lines 46-57; Fig. 1).

The Examiner asserts that Kronlund discloses a first electrode (Si) in contact with the p-type SiC, a second electrode material of Al and a third material of Ti located between the first electrode material and the second electrode material Al.

However, the pending claims recite that the second electrode material is Al and a layer comprising the first electrode material is in contact with a surface of the p-type SiC.

In contrast, as described above, Kronlund states that the Al layer is deposited on the p-type SiC, then Ti deposited on the Al layer, and finally the Si layer is deposited on the Ti layer. Therefore, the “first electrode material” in Kronlund is Al as it is in contact with a surface of the p-type SiC. Thus, Kronlund fails to disclose or suggest that the second electrode material is Al.

Moreover, Kronlund is silent regarding any of the electrode materials exhibiting a eutectic reaction or a temperature that such a reaction occurs. Although the Examiner dismisses the claim language pertaining to this feature as being “inherent” the Examiner fails

to provide any support for the allegation.

The doctrine of inherency requires that an unstated aspect of the prior art is treated as if it were expressly divulged because it is “inherent” in the prior disclosure as a matter of scientific fact. However, inherency may not be established by probabilities or possibilities. The mere fact that a certain thing *may* result from a given set of circumstances is not sufficient. *Hansgird v. Kemmer*, 102 F.2d 212, 214, 40 USPQ 665, 667 (C.C.P.A. 1939).

Accordingly, Kronlund fails to disclose or suggest, first and second electrode materials that exhibit a eutectic reaction at a temperature of 600°C or lower and a layer made of the first electrode material is in contact with a surface of the p-type SiC.

As Kronlund fails to disclose or suggest all of the features recited in the rejected claims, withdrawal of the rejection is respectfully requested.

B. The 103(a) Kronlund and Kinoshita reference rejection

In rejecting claims 2, 3, 5, 6, 8, 9, 11, and 12 as being obvious over the combination of Kronlund in view of Kinoshita, et al. (Kinoshita), the Examiner alleges that Kronlund teaches each and every feature recited in the rejected claims except for the first electrode material comprising germanium (Ge). In an effort to overcome the admitted deficiency, the Examiner relies on Kinoshita for allegedly teaching that Si is an equivalent electrode material to Ge.

Claims 2 and 3 are allowable for their dependency on independent claim 1, for the reasons discussed above, as well as for the additional features recited therein.

Regarding independent claim 5 and its dependent claims 6, 8, 9, 11, and 12, Applicants assert that there are elements in the rejected claims that are not disclosed or suggested by the combination of references.

For example, the combination of references fails to disclose or suggest first and second electrode materials that exhibit a eutectic reaction at a temperature of 600°C or lower and a layer made of the first electrode material is in contact with a surface of the p-type SiC.

As discussed above, in contrast to the pending claims, Kronlund discloses Al on the p-type SiC. As such, Kronlund fails to disclose or suggest the features as alleged in the Office Action.

Moreover, even assuming *arguendo* that Kinoshita teaches Si is an equivalent

electrode material to Ge, Kinoshita fails to overcome the deficiencies of Kronlund.

Because the combination of references fails to disclose or suggest all of the features recited in the rejected claim, withdrawal of the rejection is respectfully requested.

None of the applied references discloses or suggests the additional features recited in new claims 25-32.

III. CONCLUSION

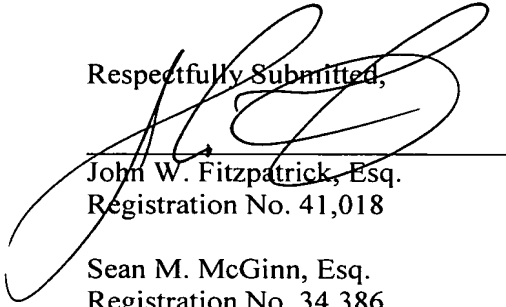
In view of the foregoing, Applicants submit that claims 1-3, 5-9, 11, 12 and 25-32, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

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Respectfully Submitted,


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